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Soil Conservation

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Growth Through Agricultural Progress

"Grass can make beautiful the hillsides, schoolyards, roadsides, farmsteads; in doing so it brings greater utility and efficiency."

—CLINTON P. ANDERSON

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Soil Conservation

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TOM DALE, Editor

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Grass Crops

In the Soil and Water Conservation Program

By Donald A. Williams

THE grasses and legumes we normally grow as sod-forming crops for forage or soil improvement and protection have played a prominent part in our national soil and water conservation program from its beginning.

Conservation farmers everywhere use sod-forming vegetation to line their waterways, to protect terrace outlets, and to stabilize the channels of diversion and drainage ditches. Contour strips of grasses and legumes are frequently alternated with clean-tilled crops to check erosion on sloping fields. Sod-based rotations are commonly used to improve soil structure and tilth. Year-round cover crops of grasses and legumes are frequently used in orchards and vineyards, while winter cover crops are regularly used on clean-tilled fields in southern climates. And, of course, most conservation farmers turn to the grass crops if they have severely eroded fields that must be retired from cultivation.

Highway engineers now regularly use grasses and legumes to protect bare cuts and fills along newly constructed roads, and to prevent erosion in roadside ditches. And it is standard practice to establish a good sod cover on nearly all earth dams or spillways built for erosion control or flood prevention.

These are just some of the more obvious ways in which we regularly use grass crops in soil and water conservation. But these crops can play an even more important role in our conservation program if we will use them to their full potentialities. They must play a dominant role in our land conversion program, and should be an integral part of most conservation cropping systems. If grass crops are to be used much more extensively, however, they must be made to bring economic returns to the farmer comparable to the returns he receives from other uses of the land. Experience has shown that this can be done. Countless examples prove that grass crops, when properly planted and managed, often produce more net income for a farmer than will the cultivated crops customarily grown on the same land.

In this day of excess production of certain basic cultivated crops, we need to apprise farmers of the possible economic advantages of shifting some of their tillable land to grass crops. Nearly 25 million acres of land now used for cultivated crops, in capability classes V to VIII, should be converted to permanent vegetation—much of it would make highly productive grassland. In addition, there are about 45 million acres of class IV land in cultivation; much of this should be converted to permanent grassland. Furthermore, much of our good cropland, classes I to III, should be planted to grass crops more frequently than is commonly done.

But probably the greatest advances conservation farmers can make in the use of grass crops is not in the planting of greater acreages, but in improving present grasslands so they more nearly reach their conservation potentials. The national conservation needs inventory, recently completed, indicates that nearly three-fourths of present grassland needs some type of treatment. Reestablishment through seeding, fertilization or liming, better management and use, or development of better soil-water relationships is needed before these grasslands approach the desired production. By improving and properly managing these grasslands, the production from them could doubtless be doubled, tripled, or even quadrupled in most instances.

It has long been an established fact that high-quality pasture is one of the cheapest sources of feed for most classes of livestock. Usually it costs about three times as much to produce a pound of digestible nutrients from grain as it does from good pasture. Fortunately, many farmers are becoming aware of the value of good pastures and productive haylands, and are beginning to treat their grasslands with the same care they give to their cultivated fields. More of them should be encouraged to do so.

A grassland program that supplies adequate amounts of good pasturage throughout the grazing season and high-quality hay and silage when needed should be an integral part of every livestock farmer's conservation plan. Furthermore, the proper use of improved grass crops should be an important part of conservation plans, even on many farms devoted primarily to the production of cash crops. These important tools in the soil and water conservation program will be used to their full potentialities only when all conservation farmers and ranchers make definite plans to so use them. Good grasslands don't just happen; they must be planned.

Good Grassland Management A Family Tradition

By Ira Clark

TOPNOTCH grassland farming has become a family tradition with the three Hubbard brothers—Wesley, Delos, and Robert. Each of these brothers, who live in the Grace-Soda Springs area of Caribou County, Idaho, carries out his grassland operations independently, and all are doing an excellent job.

Wesley lives on the old home place and runs an irrigated farm and a cow-calf feeder operation. Delos has primarily a feeder-calf, feeder-yearling layout. Robert leans strongly toward dry farming and intensive irrigation agriculture, including an irrigated pasture program that is one of the best in southeastern Idaho.

Wesley and his sons, Deon and Verl, have a self-sufficient operation. The only feed they buy is a little molasses, which they find greatly facilitates their feed mixing. Over the past several years, they have acquired range and dry farming holdings at Windmill Flats, considerable holdings in the Meadow Creek Grazing Association, and 1,017 acres of private land on the Chub Flats.

It is the Chub Flat unit to which Wes and his boys presently are giving a lot of attention. In 1953, they acquired a tract of 377 acres that had been reseeded to improved grasses, including crested wheatgrass, intermediate wheatgrass, and smooth bromegrass.

"These seedings," Wes relates, "are producing several times the feed grown on adjacent Meadow Creek range. As soon as I started using these improved seedings, I could plainly see I needed to improve my other holdings, and started to do so."

In 1957, he put 248 yearlings on approximately 350 acres of seeded pastures on June 3. On September 20, these animals were moved from the pasture. At selling time, their average gain was 2.05 pounds a day. This was a yield of about 158 pounds of beef per acre for the seeded range pastures.

"But that isn't the complete picture," Wesley points out. "On September 1, we rounded up 100 head of cows and their calves and put them in the pastures behind the yearlings. We left the cows there until November 1, and there was still worlds of feed when we took them out. That's another 200 cow-months of grazing. I'm convinced those improved range pastures will easily make 250 pounds of beef per acre per year if managed properly."

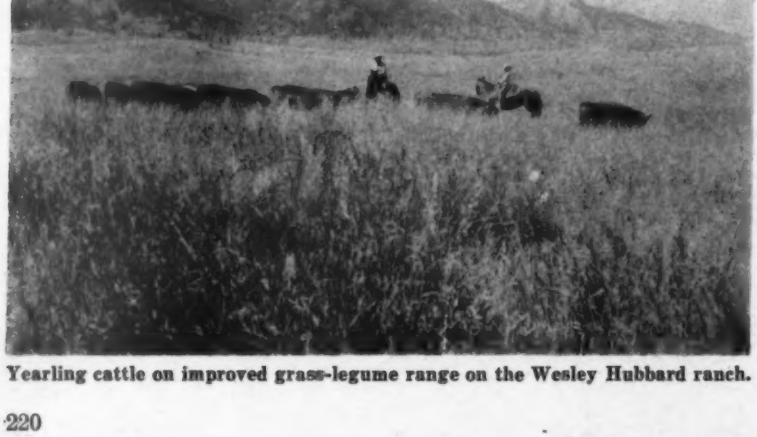
Wes Hubbard seeded an additional 400 acres to pasture in the spring of 1960.

Delos Hubbard, like his brother Wesley, is a soil conservation district cooperator. His irrigation operations are carried on in cooperation with the Portneuf district and his range operations with the Caribou district.

His operations are quite different from Wesley's. He operates 300 acres of irrigated land and 1,440 acres of range and native meadow. The range unit includes 400 acres of improved range pasture, 100 acres of meadow, and 940 acres of foothill range. Delos buys most of his feeder cattle as weaner calves, winters them at the farm, and then puts them on improved range pastures for about four months, and sells them as grass-fat feeders.

"That 400 acres of seeded pasture is the key to my beef-making enterprise," Delos says. "There's

Note:—The author is range conservationist, Soil Conservation Service, Pocatello, Idaho.



Yearling cattle on improved grass-legume range on the Wesley Hubbard ranch.

where I make my cheap gains. I stock my seeded pastures at about one yearling or a little more per acre for the summer season. Over the past 10 years, I've averaged about 300 pounds of beef per acre each year."

This high production from the reseeded pastures cannot be attributed to any single practice—it's a multiple-practice deal, as Delos points out.

"First," he says, "one has to have a high-producing stand to start with. Second, I use a rotation grazing system so that I get over the four pasture units at least twice each year. By doing this I can keep the feed fresh and the stock gaining right up until frost. And third, I avoid overgrazing. I find production goes down as soon as I overgraze my fields. I like to leave what looks like a stubble height of about six inches."

The reseeded pastures, of which Delos is so justly proud, date back to two seedings—one of 300 acres made in 1951 and the other of about 100 acres made in 1956. The basic seed mixture of each was approximately as follows: Manchar smooth brome, 6 pounds per acre; intermediate wheatgrass, 6 pounds; and Rangar alfalfa, 2 pounds. In the 1951 seeding, however, small amounts of tall oatgrass and alsike clover were added.

A check of the stands in the late summer of 1960 showed that the tall oatgrass had gone out of the 1951 planting, as had most of the intermediate wheatgrass. The alsike clover is still in, as is the intermediate wheatgrass from the 1957 planting. That the alfalfa has persisted through 10 grazing seasons attests to Hubbard's good grazing management.

Robert Hubbard, the third member of the brother trio, follows a still different but equally outstanding grassland program, as a part of his sprinkler-irrigation farming. The conservation program he follows was worked out with the Soil Conservation Service work unit conservationist at Soda Springs. It provides for an intensive cropping system without soil deterioration. It became apparent as the plan was developed that there had to be a close balance between the cropping and livestock phases of the program if a proper soil-building and high-fertility system was to be maintained. Livestock was needed to utilize the hay and other feed produced in the soil-building program.

Feeder calves on a seeded range on the Delos Hubbard ranch.

To get the program going, Robert seeded 70 acres to pasture in the spring of 1955. He planted the pasture with a light seeding of barley, using a grass-legume mixture of tall fescue, 2 pounds per acre; Manchar smooth bromegrass, 4 pounds; orchardgrass, 4 pounds; and alfalfa, 2 pounds. The pasture seemed slow to start; so he cut the barley for hay in mid-summer, sprinkled the field throughout the rest of the season, and that fall applied 200 pounds of 33-percent nitrogen fertilizer.

By early spring, the grass looked "pretty good," and Hubbard gave it another boost by applying 200 pounds of 33-percent nitrogen. He then let the pasture grow until the grass had a "real good start."

"I had put a fence through the pasture, cutting the field into two units, and had planned to subdivide each of these units into two," Robert recalls. "But when I turned 75 head of steers in on May 15, it soon became obvious I was not going to need all that pasture. I grazed only one 35-acre unit that year, and cut the other field for hay."

He left the 75 steers on the pas-

Sprinkler-irrigated pasture on the Robert Hubbard farm.

ture for three months, a stocking rate of 2.14 steers per acre.

"I sold at Ogden that year," he says, "and found the steers had made just a shade short of three pounds a head per day. It figures out that the pasture produced about 600 pounds of beef per acre that year.

"In 1957, I grazed the 35-acre pasture with 97 head of yearling heifers. The other 35 acres was plowed out for potatoes. I put 300 pounds of 33-percent nitrogen on the pasture the first thing in the spring and turned the cattle on it on May 1. I decided to try finishing that bunch of heifers on grass to see how it would work out. Within a few days, I started feeding grain. On August 19, I topped out 70 head and sold them; the balance went on September 28. They had made a little more than 2½ pounds per day while on pasture."

Robert Hubbard in one of his potato fields.

Discussing production for 1957, Robert says: "It's difficult to separate gains made from grass from gains made from grain. According to my records, however, I think that the pastures made over 700 pounds per acre."

His records show that his returns from the pasture compared favorably with those from wheat, potatoes, or beets, taking into account production costs.

"Pastures," Robert emphasizes, "are just part of my irrigation farming operations. In the spring of 1960, I plowed out about 20 acres of the 35 acres of pasture and planted it to potatoes. That's where it fits into my cropping scheme, and I find if a person plans to follow a soil building plan, he had better use some grass crops in his rotation."

Taken collectively or individually, the three Hubbard brothers, Wesley, Delos, and Robert, seem to know how to handle grass—at least they are doing it and doing it well.

Birdsfoot Trefoil Pastures In Iowa

By John K. Maddy

BIRDSFOOT trefoil pastures are paying big dividends to many Iowa farmers, according to a recent survey made of soil conservation district cooperators who have been using this legume for several years. They report that animal gains have been more than double those obtained from unimproved pastures on similar soil. It has proved to be equally profitable to both sheep and cattle raisers.

The total acreage of Empire birdsfoot trefoil in Iowa had increased to more than 100,000 acres by 1960, with prospects for still further substantial increases in the immediate future. This has been a remarkable increase, considering the fact that the first known planting in Iowa was made on a field of less than 2 acres in 1938.

Birdsfoot trefoil is a perennial plant similar in appearance to alfalfa, but has a weak stem which does not permit erect growth. It has most of the good qualities of alfalfa; and, more important, stands often improve by natural reseeding. It can withstand much closer or continuous grazing than alfalfa and does not cause bloat.

Best results from trefoil are obtained when all good management practices are used, including controlled grazing and fertilization. It is usually seeded as a companion with other grasses; bluegrass or orchardgrass have been favored as companion crops. It has not been definitely established how long trefoil stands may persist, but Iowa's first seeding made on the Howell farm near Centerville in April 1938 is still in production. In fact, it is in better condition now than when first seeded. The original 1½-acre seeding on this farm has been increased to 135 acres of improved pasture.

Birdsfoot trefoil usually does not produce as much total forage as alfalfa. But some soil types in Iowa, with heavy subsoils, produce more trefoil than alfalfa. Regardless of forage production, it seems that animal gains made on trefoil are equal to and sometimes exceed

Note:—The author is agronomist, Soil Conservation Service, Des Moines, Iowa.

those produced on alfalfa.

Research by Iowa State University shows that steer gains on unimproved pastures, mostly bluegrass, average from 70 to 130 pounds per acre. The same pastures renovated with trefoil give average gains ranging from 150 to 450 pounds per acre.

According to the research information released, the average annual cost of seeding, fertilizing, and maintaining trefoil pastures for a 10-year period amounted to $6.50 per acre. The 100 to 200 extra pounds of beef per acre each year is a good dividend for this small investment.

Soil conservation district cooperators interviewed recently say they are finding this "extra dividend" available. Although their returns per acre may not have been figured as scientifically as those on University farms, they are quite enthusiastic about their trefoil pastures. The last few years included a period when growth conditions for trefoil were favorable; and many stated that they had difficulty in utilizing all the forage produced during the early grazing season.

In addition to its use as pasture, trefoil may be used for hay or silage. An interesting report comes from the Jon Bar Ranch located in the Dallas County Soil Conservation District. On this farm, 150 loads of green chopped silage were taken from a 32-acre field. A few loads weighed at harvest time ran a trifle over three tons per load. This would amount to 14 tons of green material per acre.

Loren Loomis from the Warren SCD stated that the land he now has in trefoil was purchased in 1948 for $30 per acre. It cost him $20 an acre to renovate it. The land ranged from Class IV to VII and was producing very little pasture before treatment. In 1960 he ran 20 cows with calves for 4 months and 60 yearlings for 2 months on this 30-acre pasture. The calves and yearlings made a total gain of 11,600 pounds of beef for this period, an average net gain of 387 pounds of beef per acre. In addition, 1 bull, 18 sows, and 130 pigs were run on the pasture during a part of the period.

Arlie Horn from the Davis SCD states that after he learned what his trefoil fields would produce and remembers what his old bluegrass fields produced, he feels terrible about his loss of production in the past. He planned to complete the renovation of his remaining pastures this spring by seeding the last 25 acres of trefoil. He will now have a total of about 100 acres of improved pasture.

Vic Cowles, a cooperator with the Davis district, says he makes more money from his 40 acres of trefoil than he does from any other 40 acres on his farm. This includes some land that occasionally produces over 100 bushels of corn per acre. During the 3 years, 1958-60, he estimates his average gains from steers, during the 5 or 6 months they were on this trefoil pasture, ranged from 375 to 630 pounds per acre.

Birdsfoot trefoil on the Jon Bar Ranch that reached nearly 4 feet in length.

Blake Phelps of the Van Buren SCD pastured 25 cows, 23 calves, 10 yearling steers, and 175 ewes with lambs for 6 months and another 25 cows for 3 months on his 90-acre trefoil pasture. He figured his net gains from the calves, yearlings, and lambs at 358 pounds per acre for the season. In addition, the pasture furnished a maintenance ration for the cows and ewes.

Edgar Reed, of the Polk SCD, pastured 70 ewes and 60 lambs for 5 months on his 20-acre trefoil pasture in 1960. He estimates the gains from the lambs alone at about 300 pounds per acre.

Ed Wise, who has pastured trefoil for many years in the Jasper district, kept records last year on his purchases and sales of yearlings on pasture. Before the results were available he already had agreed to cash-rent the field this year. "If I had known the profits I was going to make with so little effort and investment, I would never have rented it," he stated.

Cattle grazing a birdsfoot trefoil-grass mixture in central Iowa.

A Million Have Tested Their Skills in

Land Judging Contests

By David O. Davis

IT is morning in Oklahoma City and a large crowd is on hand. Four serious-faced young men walk toward a hole in a field at the city's outskirts.

It is no golf match. Instead of a bag of golf clubs, each young man carries a clipboard. The hole is about 2 feet wide, 3 feet deep, and 6 feet long.

The young men stare intently into the hole. One drops to his knees for a closer look. Two get down into the hole. Each takes a handful of soil from the mound of earth beside the hole. He squeezes it thoughtfully into a little ball.

Next they look to one side of the field. Then they look at the sign at the edge of the hole.

Not a word is spoken. But pencils flash, and notes soon fill the sheets of paper on the clipboards.

These young men—and other such groups waiting nearby—are competing to see who can most accurately appraise the capability of the land, its best use for agriculture, and the most effective treatment for it. They will test their skill on several fields.

This is the annual International Land Judging Contest, climaxing many local and State qualifying contests involving thousands of young people.

FFA members participating in the international land judging contest in 1960.

The competition in Oklahoma's capital city had its beginning a decade ago. The land judging idea possibly started 20 years ago with a simple soil identification contest that a Soil Conservation Service employee, Sam D. Lowe, at Pauls Valley, Okla., held for a few youngsters. Lowe believed that such competition had its greatest value among small local groups.

But the idea was bound to expand. Among those who saw unusual possibilities in land judging were Harley A. Daniel at the Great Plains Experiment Station in Guthrie; Edd Roberts, Extension soil conservationist for Oklahoma; and Wendell Tascher, Extension soil conservationist, Washington, D. C. Later, Loyd M. Adcock, in the Foreign Training Division of the Foreign Agricultural Service, saw the opportunity to introduce land judging to foreign nationals who come to the United States for training in various phases of agriculture.

Also, there were folks like Louis E. Derr, State soil scientist for the SCS in Oklahoma; Dan Diehl, Extension district agent in southwestern Oklahoma; Sandy Saunders, agricultural reporter for Oklahoma City radio and TV station WKY; and Clarence Bunch, range management specialist, and R. E. Chiles, Extension pasture specialist, both with Oklahoma State University. Each made his own contribution to the idea's development.

Lowe's soil conservation district-

Note:—The author is field information specialist, Soil Conservation Service, Denver, Colo.

wide competition set a pattern for other districts. Daniel brought groups of teams together to study soils on the experiment station. Roberts spread the idea over Oklahoma, organizing and conducting contests. Tascher saw the national possibilities and promoted interest and action in other States. Adcock was primarily responsible for the development of interest in the contest abroad—to make it an international event.

Saunders sent many a message over the air to stimulate the interest of Oklahoma City people and others over the State and Nation. Derr lent counsel and guidance in working out practical rules and score cards, which have been adopted generally where competition is held.

Bunch and Chiles were instrumental in developing the pasture and range judging contest, now held in conjunction with the land judging. Oklahoma City businessmen and other people have successfully resisted efforts to take the contest elsewhere.

It is a big affair. It has taken on a definite national and international complexion. People of other nations first came to observe; now they compete. The word "International" has been part of the contest title since 1955.

The contestants include teams representing colleges, 4-H Clubs, and FFA chapters, as well as those who compete individually—foreign participants, adult men, and women and girls from the United States. On the first day they go through a "school." This is a series of exhibits, demonstrations, and discussions on the State Fair Grounds. The school gives the contestants a refresher course in the principles of land capability classification, especially as it relates to Oklahoma soils and agriculture. Contestants also review the identification of major vegetative species for the evaluation of range condition.

In this way, the contestants are informed about the judging problems, rules, scoring, and other matters that will confront them on the contest fields near the city. Location of the fields is known only to officials before the contest.

Women and girls testing their skill in land judging at Oklahoma City in 1960.

The land judging competition takes place the second morning. The teams judge soil depth, texture, permeability, slope, historical erosion, and internal drainage. They estimate the slope of the land in which the holes are dug. They then give their decisions as to the land capability class, the needed treatment of the soil, and its best use for the future.

That afternoon the pasture and

4-H Club members participating in the 1960 land judging contest near Oklahoma City.

range competition takes place. Those competing in this part of the event identify range and pasture plants, and evaluate at least four areas for range condition.

Awards are presented to winners in a gathering at the State Fair Grounds. The awards—plaques, medals, trophies, and cash—are provided by the co-sponsors, Station WKY-TV and the Oklahoma Chamber of Commerce.

More and more colleges are adopting land and pasture and range judging as an effective way to teach an understanding of soil and its treatment. The number of college contests grows each year. The same is true of high schools—and even grade schools. Many States have judging programs. Participation in some States reaches 10,000 or more people annually.

These contests have become an important annual activity in soil conservation districts throughout the United States. District governing bodies have promoted the contests because, in addition to the conservation principles taught, they are a means of discovering and developing needed future conservation leadership.

Important, too, is the fact that each year more and more urban people enter the competition.

Records indicate that more than a million people have taken part in such judging programs since their beginning. Present estimates show that annual participation has grown to 250,000. Three-fourths of these contestants are young people. There is no record of how many have engaged in land judging contests in other countries, but since 1955 some 230 people from other nations have entered the Oklahoma City competition, with never fewer than 9 foreign nations represented. In 1960, representatives from 16 countries took part. Because the contest is conducted in English, they compete only against each other.

Growth of the Oklahoma City contest has been steady from the first—about a 25-percent increase each year. There were 675 in the 1960 competition. Twenty-six States were represented. And the Tenth Annual International Land, Pasture, and Range Judging School and Contest, on April 27 and 28, 1961, was expected to be the biggest yet.

Four Times the Hay With Half the Water

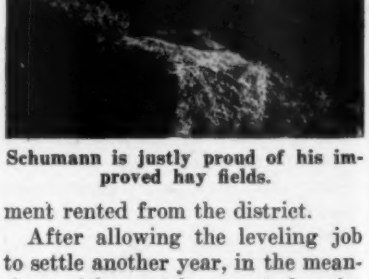
By Lenard Smith

GEORGE Schumann of Clover Valley, Nev., has set an enviable example for his rancher neighbors in Elko County when it comes to raising an abundance of good-quality hay on high-altitude native meadows.

He has done so through the same soil and water conservation ranch improvement program that brought him the Junior Chamber of Commerce "Outstanding Young Farmer of the Year" award for Nevada in 1959. It has meant good management and hard work.

Schumann's hay yields have quadrupled, from only a ton or less per acre before he began his conservation program to an average of 4.3 tons per acre—this with much less irrigation water used and lower harvesting costs. He has converted 270 of his 600 irrigated acres by leveling and establishing improved alfalfa and clover-grass hay during the 14 years he has occupied the ranch.

In developing better hay stands, Schumann first plows out the native sod four or five inches deep with a moldboard plow, turning the sod completely under, and seeds a grain crop. To keep the sod from growing again, by not stirring it up, he uses a light disk in preparing the seedbed for grain. When the sod has deteriorated, Soil Conservation Service technicians working with the Clover Soil Conservation District help Schumann with the leveling plans. The leveling is done by contractors or with equipment rented from the district.



Schumann is justly proud of his improved hay fields.

After allowing the leveling job to settle another year, in the meantime raising another crop of grain, he carefully prepares the seedbed

Note:—The author is soil conservationist, Soil Conservation Service, Wells, Nev.

George Schumann admires purebred bulls knee-deep in improved grass stand.

for the new hay. Fields are planed four or five times; then a home-built drag is used to give the land a final dressing before seeding. This smooth, firm seedbed is one of the most important aspects of the whole program. The seedbed also receives a dressing of 200 to 300 pounds of 16-20-0 fertilizer per acre before seeding.

With leveled fields, this Nevada rancher has found he can irrigate twice the acreage with the same amount of water. Previously, he was irrigating 7 or 8 times for one crop of hay, but now it takes only 3 good irrigations to produce 2 crops of improved hay. He uses the extra water to irrigate more pasture land, to keep the summer forage in balance with the increased winter feed.

The improved hay is much cheaper to harvest, per ton, than the native hay, because of increased per-acre yields. Except in baling and stacking, the costs are fairly well fixed, acrewise. Whereas it costs about $6 a ton to put up native meadow hay, Schumann can harvest the improved hay for about $3.75 per ton.

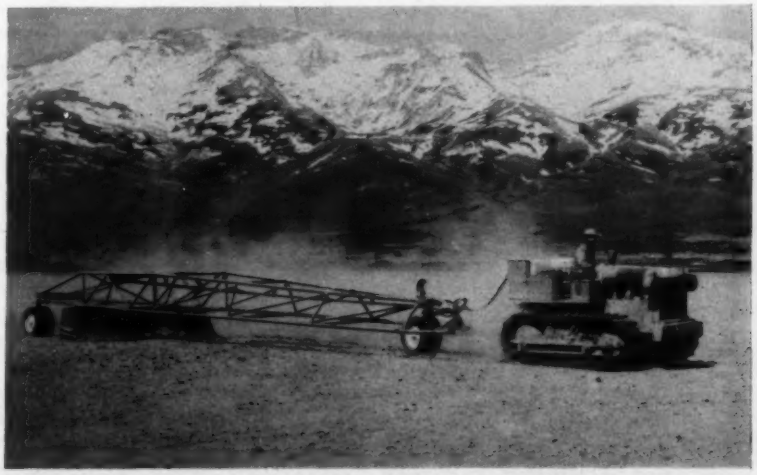
Schumann, who raises and sells purebred bulls, explains that good feed is essential to keeping his cattle in top shape.

"The cattle eat more improved hay, probably due to the palatability," he says, "but the calves are healthier and will put on about fifty pounds more during the winter than those on native meadow hay."

He is convinced that a good roughage (high-quality alfalfa-grass hay) is better for range bulls than a high concentrate-poor roughage (native meadow hay) ration: "It puts them in better shape to withstand the rigors of the open range country." By feeding improved hay, he is able to cut the concentrate finishing ration in half. His cattle are becoming well known in the range country of the West.

Schumann's ranch has been in the drought disaster area 3 of the last 10 years. The ranchers in Clover Valley rely on spring snow and water runoff. When the snowpack is too light, little or no water reaches the ranches. To offset drought hazards, Schumann decided to develop an irrigation well. After the spring snow-water runoff is gone, the well will supply water to keep the improved hay stands growing throughout the season. He also is putting in a pipeline or ditch-lining project. This will bring the water across the long alluvial fan from the mountains to his fields without the usual high seepage losses.

Schumann has been a cooperator-board member of the Clover Soil Conservation District since its formation in 1956, and was its first chairman. He first developed a soil conservation plan while a cooperator in the Ruby district, before its division and formation of the Clover district.



Schumann planing 80-acre field with soil conservation district equipment for irrigating with water from snow-capped peaks beyond.

WANTED: Grass Planting With Fewer Failures and Lower Costs

By C. W. Gantt, Jr., and W. C. Hulburt

MORE reliable methods of establishing vigorous stands of grass are being sought in cooperative research carried on in different parts of the country by the Planting and Fertilizing Equipment and Practices Unit of the Agricultural Research Service.

This Federal-State research was started about 10 years ago because of the high cost of establishing desirable grassland species on pasture and hay lands, with the high rate of failure of stands being one of the principal contributing factors. Soil and water land treatment is among operations affected. As Dr. H. A. MacDonald of Cornell University summarized the situation in a grasslands symposium at the 1956 meeting of the American Association for the Advancement of Science:

Only one-third of the grassland acreage planted each year usually results in a good stand; one-third is a total loss, and the remainder usually results in such a poor stand that its eventual use as productive grassland is doubtful. His conclusions were based on extensive field surveys.

From the start of this ARS program, it was believed that, with proper machine design and proper methods of placement of seed and fertilizer, good stands of grass and legumes could be established quicker and with fewer failures than farmers were obtaining. The experiments involve precision methods of placement and the positions of seed and fertilizer in the soil with respect to each other. A machine was designed and built especially for this purpose for use in field plots.

Results have shown that in most instances small grains and grasses will come up quicker and grow faster when fertilizer is placed separately from the seed instead of with the seed, as is done with most of today's grain seeding machines. They also have shown that in most instances legume seed planted in narrow bands, and covered with narrow presswheels, germinates sooner and grows more rapidly than seed broadcast and covered with full-coverage packers.

Many, but not all, of the results have been encouraging. Thus at Athens, Ga., during one season, band placement of Sericea lespedeza seed and fertilizer gave higher yields than the one sure method of obtaining a stand of sericea, which was to broadcast the seed and cover it with a sawdust mulch. However, another year, the only plots that came through were those under sawdust mulch.

In Tennessee, band-seeded alfalfa and banded fertilizer treatments were best in the spring, but for fall planting, broadcast fertilizer and seed gave the highest stand counts. In three years' experiments with Sericea lespedeza in Alabama, equal stands of sericea were obtained with both band-seeding and broadcast-seeding methods. In Louisiana experiments with oats, ryegrass, and crimson clover, the highest yields were obtained by banding seed and fertilizer, and the lowest from broadcasting.

Although findings of this research have not been conclusive as to a single method's being superior at all times and in all locations,

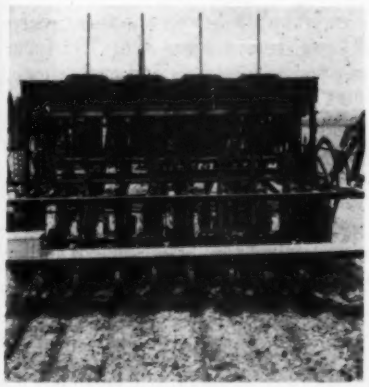
Six weeks' rye growth with fertilizer placed (left) in contact with seed and (right) 1 inch below seed.

Note:—The authors are, respectively, project leader, Southeast Project, Athens, Ga., and head, Planting and Fertilizing Equipment and Practices Investigations, Beltsville, Md., both of the Agricultural Research Service.

the precise placement of seed and fertilizer has been shown to be one of the key methods of insuring good forage stands when they are subjected to adverse planting conditions.

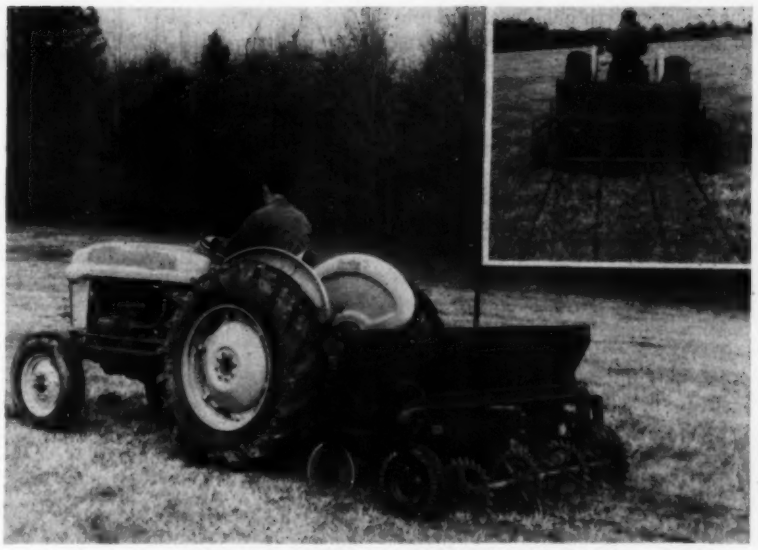
Six special machines are used for this research. They have a wide range of seed planting and fertilizer placement positions, including means of broadcasting both seed and fertilizer, such as: drilled fertilizer in many positions in respect to drilled rows of grass seed (including contact of fertilizer with seed); drilled fertilizer with broadcast seed; broadcast fertilizer with drilled seed; and broadcast fertilizer with broadcast seed. Closely controlled devices for the compaction of soil below and around the seed have been an important part of this study.

A machine of this type for farm use may be developed later by industry, if the experimental data



Precision drill deposits seed by single disk with gage wheel.

prove a machine of new or altered design is needed and justified. Some types of equipment are now available to farmers for drill seeding with fertilizer placement in prepared seedbeds, but they are limited in makes and models. For example, grassland banding attachments for fertilizer grain drills are sold by a number of companies. These kits are good for drilling most legume seeds and small grass seeds that may be mixed with legume seed in the grass seed attachment box, such as timothy and birdsfoot trefoil. However, many of the grass seeds like orchardgrass, tall fescues, bromes, and bluestems are not adaptable to this arrangement, except for one recently marketed machine.



Heavy-duty drill for interplanting in sod.

Under adverse planting conditions—usually deficient moisture and sometimes extremely low fertility of the soil—two planting methods have produced superior stands, but at some locations have shown the extreme variation from no stand to a full stand: (1) Planting seed in rows, with fertilizer placed in a continuous band about one inch below the seed row; (2) compaction of the soil below and around the seed, with little or no compaction of the area between the seed rows.

Under good growing conditions, these methods seldom show improved stands over the common broadcast and land-rolling method, but the method of drilling seed and precise placement of fertilizer provides good insurance against stand failures if adverse weather conditions prevail after planting. The ultimate aim of the research agricultural engineers and agronomists cooperating in these projects is to develop practical and economical machines and methods that will insure the farmer of getting a good stand and growth of grassland foliage regardless of such weather and other factors.

Another benefit of precise placement in grassland planting is the extension of planting periods. The quicker growth of the plants by the proximity of adequate plant food now permits planting of slow-growing grasses and legumes up to a month later in the spring, as these new plantings have been found quite capable in most instances of competing with weeds that sprout in warm weather. Likewise, planting of the grasses and legumes may be as much as a month later in the fall, as the usual vigor-

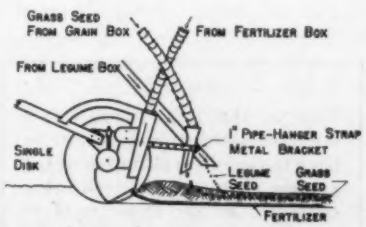


Diagram of band-seeding attachment for fertilizer grain drills.

ous early growth enables the young plants to withstand adverse winter weather.

All these experiments have been on prepared seedbeds, with the fields subject to soil erosion until the grass establishes a good cover. In the interest of soil conservation, research also is being done on placement of the fertilizer and new seed in existing sod. Several machines for interplanting winter grains in pasture and hayland sods have appeared on the market the past 10 years, and are known by such names as pasture renovators or grassland drills.

Sod interplanting drills differ principally from grain drills in two respects: The frame is heavier and working parts are built stronger for tearing through the old sod; and large notched colters are used to cut sod for depositing the fertilizer and seed, with a narrow shovel that disturbs the soil very little.

Use of sod interplanting drills generally extends the number of annual pasture days. Their greatest use has been in the southern part of the country, where winter grains are grown in pastures which are predominately summer grasses such as bermudagrass and bahiagrass. Except for seeding crimson clover in bermuda sod, grasslands to be interplanted need to have a desirable balance of legumes and grasses. There also must be taken into account such factors as competition to the new plant from the existing sod, inadequate moisture at seeding time, and cost of the equipment and its operation.

No. 62

This is the sixty-second of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

Path Valley's Green Acres

By William Hayes and Henry Warner

GRASSLAND farming has brought new life to farmers, sportsmen, and businessmen of Path Valley in Franklin County, Pennsylvania. Twenty years ago, scrubby growth and erosion scars marked the valley landscape. Today, it's a shining example of a valley that came back through conservation. Grassland farming made the difference.

A local banker and farmer, Robert Crouse, sums up the community-wide benefits resulting from the change this way: "Grassland farming has saved our agricultural community. Increased grassland acreage, better varieties of grasses and legumes, and application of conservation practices have tripled the livestock-carrying capacity of the farms in the valley."

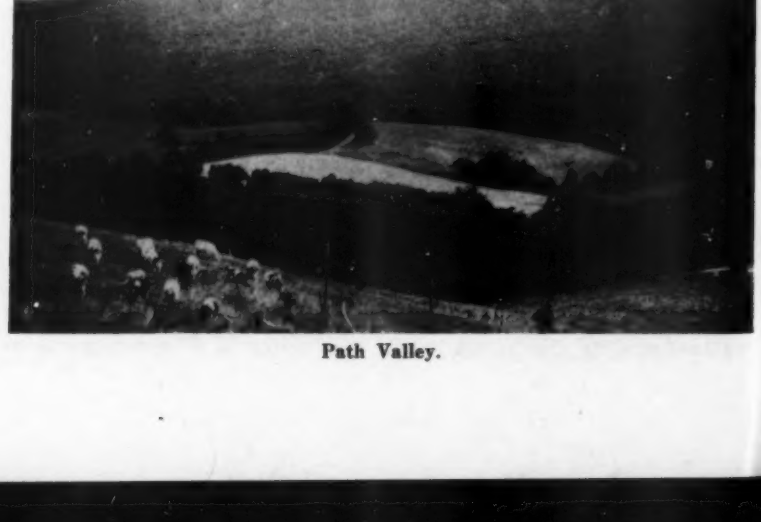
"Our banking business is farm business," Crouse says. "Our livelihood in Path Valley is dependent upon the soil. The quality of the soil and the economic stability of the farm income are of primary interest to the country banker. I always encourage my customers to develop a farm conservation plan for their land."

Crouse has watched many of the farms of this 35-mile-long, 2-mile-wide valley turn into a "green paradise."

A representative Path Valley dairy farmer, Albert Neusbaum, recalls: "There was nothing but weeds and briars on the farm when I bought it 18 years ago. The farm supported only 5 cows, 8 sheep, and 2 horses. Since developing a farm conservation plan in 1942, I have increased the livestock to 32 head of dairy cattle and have been able to sell hay every year."

Mr. Neusbaum's farming program, like the programs of other farmers in the valley, is centered

Note:—The authors are, respectively, agronomist, Harrisburg, Pa., and work unit conservationist, Chambersburg, Pa., both of the Soil Conservation Service.



Path Valley.

Robert Crouse (right)—farmer, banker, district director—discusses conservation farm plan with Henry Warner of the SCS.

around mixtures of alfalfa and bromegrass and orchardgrass on hilly land, and bluegrass in the lowland, for permanent pasture. One of the keys to higher production has been a shift in the rotation from corn, wheat, wheat, and hay to corn, oats, and four to six years of alfalfa-grass hay and pasture.

All cropland and hayland on the farm is stripcropped, and Neusbaum has built more than 7,000 feet of diversion terraces.

Bluegrass in the bottom usually supplies most of the May and June pasture. First-cutting alfalfa is put in a trench silo or is "green chopped" to supplement the bluegrass. Later alfalfa cuttings are either aftermath-grazed, "green chopped," or made into hay and silage for winter feeding.

Seedings usually are established in oats with heavy applications of fertilizer. Before seeding, Neusbaum drills deeply 400 lbs. of 0-20-20, and at seeding time applies 300 lbs. of 5-10-10 in a band. Hay and pasture fields are topdressed annually with heavy applications of manure or 400 lbs. of 0-20-20 fertilizer. Lime is applied to maintain a pH of 6.5 to 7.0.

Neusbaum says: "When we bought the farm, we didn't have a thing we could call our own. My wife and I were in debt on stock and equipment, and I feel sure we could not have met the challenge had it not been for the Franklin Soil Conservation District and the Soil Conservation Service. Most of us in Path Valley feel this way."

The good results in Path Valley are spreading to the rest of Franklin County. Over the past 25 years, census figures show a 26-percent reduction in grassland acreage in the State, but a 13-percent increase in the county. Alfalfa acreage increased by 312 percent in the State, but there was an increase of 407 percent in the county. Permanent pasture increased 11 percent in the State, while it increased 66 percent in the county.

As the Path Valley landscape has changed, so has the fishing. Conocheague Creek, which drains the valley, has become a trout stream again. In 1945, the Pennsylvania Fish Commission tested the water and found it unfit for trout. A similar test in 1950 revealed improvement, but the water still did not pass the test. The test was rerun in 1954, and Conocheague Creek passed.

The West Branch of the Conocheague has been stocked with trout every year since 1955. Trout are doing well in the stream. A representative of the Commission has pointed out that the increase in grassland acreage and other conservation practices have decreased runoff and increased infiltration and water storage by which streamflow and a proper water temperature for trout are being maintained.

It is easy to measure the results of grassland farming in Path Valley. To the farmer, it has meant more cows and increased income; to the fisherman, trout; and to the businessman, more trade. Yes, grassland farming has brought new life to the Valley.

The Big 40

By H. Obert Anderson and R. K. Lawson

FOR years, Jim Wilson had planned on buying a small piece of land. But unexepected things kept coming up, and it was not until 1950 that Jim finally bought a 40-acre farm east of Omaha, Ill. The buildings were solid but not much to look at, needing a few boards here and there and all needing paint. The old hay barn was small, 30 by 50 feet. The land needed soil conservation treatment to make it an economic family unit.

With help of the Gallatin County Soil Conservation District and Soil Conservation Service technicians, Wilson developed a conservation farm plan for his 40 acres. The first corn crop averaged 25 bushels per acre. Four years later, after needed soil treatments were made and a crop of legumes and grass plowed down, the corn on a 5-acre 4-H test plot made 142.7 bushels an acre. In 1956, a dry year, the corn averaged 129 bushels per acre and the 5-acre test plot produced 136 bushels to the acre.

With corn yields up to well over 100 bushels an acre, Jim Wilson began to figure up income and expenses. He decided that sales from the four-year rotation of corn, soybeans, oats, and legumes and grass were not paying for the wear and tear and replacement of machinery necessary to harvest these crops.

At this time, with the assistance

Note:—The authors are, respectively, work unit conservationist, Ridgway, Ill., and agronomist, Urbana, Ill., both of the Soil Conservation Service.

Elevator screenings of corn and soybeans that are used as supplemental feed on the Wilson farm.

of SCS technicians, Wilson revised his conservation plan and started a grassland program with livestock on the 40 acres. Six pasture fields were planned. The soils on all fields were re-tested, and minerals were applied to soil-test requirements. The pastures were seeded in March with a mixture of tall fescue, timothy, lespedeza, and ladino clover, with one bushel of oats per acre as a nurse crop. The oats were clipped before heading and the aftermath left on the new seeding. The grasses and legumes were clipped again in August for weed control.

Wilson has an arrangement with a local elevator to remove cob ash and elevator screenings of corn and soybeans, which he gets free of charge except for his labor and hauling expense. He applies the corn cob ash to his pastures at the rate of 1,700 pounds per acre. He figures this is equivalent to an 0-2-25 fertilizer in fertility value. The screenings are stored in an old machine shed and stake-fence-type silos covered with plastic. The screenings contain everything from weed seed to whole beans and corn, but on the average are a cheap source of protein supplement. He feeds one pound of this material per head per day except in dry weather, when the rate is increased to two pounds.

Under his new program, Wilson feeds out 175 head of cattle every year. He usually buys the feeders in the fall, tries to put 400 pounds of gain on each animal, and sells them by late July or early August. This schedule gives the fescue and ladino pastures a month's rest before a new bunch of feeders are bought and turned onto them.

In 1960, 175 head of feeders were turned onto 10 acres of fescue in February and sold in August. The cattle averaged 500 pounds when turned in and were sold off at 850 pounds, an average of 350 pounds gain per animal.

Jim has records to show that daily gain from 1½ to 3 pounds per animal is possible on good fescue-ladino pasture.

Wilson applies about 12 tons of manure per acre to his pastures every third year, in addition to droppings left by the cattle while grazing. The cattle are moved to a new pasture every three or four weeks, depending on pasture growth. Each pasture is mowed and the droppings scattered after the cattle are taken off. The cattle are fed mostly hay during the winter months, as a supplement to pasture feeding.

Mr. Wilson also started swine feeding three years ago. He must buy all of the feed for the hogs except that provided by pasture. He now carries 75 sows on 15 acres of ladino, fescue, and bluegrass pasture. Litters are weaned at six weeks, and sows are bred to produce two litters a year. An old hay barn is used for a farrowing house, accommodating 20 farrowing crates, but he plans to build a new farrowing building. The sows and litters are rotated on the three pastures the year around. Feeder pigs are fed out to market on ladino pasture. Jim says, however, that "Cattle have one big advantage over hogs—they will give you a market for large amounts of roughage such as fescue-ladino pasture, silage, and hay."

Jim Wilson and SCS technician John Daily on a 10-acre fescue-ladino pasture with feeding shed in background.

Most soil conservation districts have a number of 40-acre farms. It isn't always possible to make livestock farmers out of grain farmers; but often when the net returns are studied, the intensive use of small acreages by livestock is seen to make a more economic enterprise.

Shred Cornstalks To Cut Erosion Losses

Shredding cornstalks immediately after harvesting will cut soil erosion losses in half on weed-free cornfields, report USDA scientists at Lafayette, Ind. In studies conducted in 1958 and 1959, total soil losses from a control plot amounted to 1¼ tons per acre, while losses on a plot which had been gone over with a flail-type shredder were only ½ ton.

When the shredded cornstalks were disked, however, erosion losses rose to 1 ton per acre. Disking usually loosens and exposes much of the soil which otherwise would be protected by the shredded stalks. For this reason, disking of shredded cornstalks is undesirable unless necessary to prevent stalk blowing.

Since as much as 25 percent of the average annual erosion potential occurs during the corn residue period in some areas, shredding cornstalks can significantly reduce soil losses on fields not protected by other mulches, the researchers point out.

Arkansas Farmers Like Sericea Lespedeza

By Wilson W. Ferguson

CONSERVATION farmers in western Arkansas have found Sericea lespedeza a dependable plant to grow for hay, pasture, and for erosion control.

They like sericea because it produces hay and grazing every year. Even during the frequent drought periods that occur in this area, sericea remains green and produces forage when most other pastures and meadows have dried up. They also select sericea in their soil and water conservation programs because of its vigorous growth, long life, self-mulching habit, and extensive root system which improves the soil and protects it from erosion. The average rainfall in this area is nearly 50 inches a year, most of which falls as hard, driving rainstorms in normal years.

Mowing 15-inch-high Sericea lespedeza on Dutch Creek stock farm in the Yell County Soil Conservation District.

Sericea grows successfully on shallow or deep soils with varying degrees of native fertility. It also is grown on unproductive borders along margins of woods and on odd areas, to provide wildlife cover.

Perry King, a cooperator in the Franklin County Soil Conservation District, harvested 100 tons of high-quality hay from 65 acres of Sericea lespedeza in 1960, despite a prolonged summer drought. In 1958 and in 1959, years of normal rainfall, approximately 200 tons were cut from this same acreage.

King has 100 acres of Sericea lespedeza on his 983-acre livestock farm. Thirty-five acres have been placed in the Conservation Reserve, as have large acreages in Arkansas. Such areas are providing excellent habitat for quail and many other birds, while improving and protecting the soil for the future.

King reports that his cattle eat sericea hay readily when it is mowed before it reaches a height of 15 inches, and provided it is baled as soon as possible after it is dry enough, normally the same day it is cut. His experience has been that if sericea lies in the field

Cattle grazing in 40 acres of Sericea lespedeza on Glen F. Wallace farm in the Mine Creek Soil Conservation District after 41-day drought.

Note:—The author is agronomist, Soil Conservation Service, Little Rock, Ark.

too long it sheds its leaves and the hay is stemmy and of poor quality.

King used to mow his sericea three times a year. The last three years he has cut two hay crops a year and harvested a seed crop in the fall. He has found that allowing the sericea to grow for seed helps maintain a vigorous stand. In 1958, 3,300 pounds of clean scarified seed was harvested, and 2,500 pounds in 1959; but in dry 1960, the yield dropped to 600 pounds.

King planted his first sericea in 1946, as a result of information supplied by J. O. Murphy, work unit conservationist of the Soil Conservation Service at Ozark.

"I wore out the knees of my pants the first year showing Mr. King the small, spindly sericea plants," Murphy recalls. "I had to work closely with Perry to keep him from plowing it up."

Roy Rogers of the Rich Mountain district harvested 443 bales of hay in two cuttings from 5 acres of Sericea lespedeza in 1960. Rogers gets leafy, high-quality hay by cutting his sericea before it reaches 14 inches and baling within 24 hours. Rogers planted his sericea in 1957 and 1958, on a clean, firm seedbed to which 200 pounds of 20-percent superphosphate and 2 tons of lime to the acre had been applied.

Sericea has been used considerably for grazing by Rich Mountain district cooperators, especially during the drought years of the early 1950's.

M. H. "Chick" Otwell of the Washington County district sells all his surplus sericea hay to riding-horse owners in nearby Springdale. He says they pay a 50-percent premium for sericea hay over other hay available in the area.

In 1950 "Chick" mowed his 16-acre sericea meadow once and put up 700 bales of hay. The field was grazed the remainder of the season. In 1959, about 1,400 bales were harvested from two cuttings. Otwell has not fertilized his sericea since it was planted in 1956.

Soil Stewardship Week
A Community Undertaking

By Paul Hutton

ONE of Tennessee's most effective county-wide Soil Stewardship Week observances in 1960 was sponsored by the two-year-old Jefferson County Soil Conservation District. Systematic planning and leadership in this endeavor were mainly responsible for the excellent results.

The careful preparation by the district and cooperating churches, businesses, and agencies culminated in the following activities: (1) Material and assistance on the subject was offered, in writing, to every known minister in Jefferson County; (2) 2,000 special church bulletins, posters, and booklets were distributed; (3) a series of articles, written by local ministers, were published in the local papers; (4) a television program was presented; (5) an on-the-farm study of conservation practices for ministers and laymen was made prior to Soil Stewardship Week; (6) Soil Stewardship programs were conducted by young people's church groups; and (7) special sermons were delivered in 33 churches.

Planning for these activities was started five months in advance. A six-man committee was asked by the district to work out the details for the observance. The committee was composed of ministers R. B. Pritchett, Church of the Brethen; Roland Aytes, Methodist; Zachary Piephoff, Presbyterian; and Bob McCray, Baptist. Serving with them was A. B. Strand, of the University of Tennessee, and district board member Charles T. Baker.

Reverends Aytes, Piephoff, and McCray jointly prepared and sent a letter explaining the proposed program to all other ministers of the county. They offered materials and assistance to any church or group interested in a special service on Soil Stewardship. Informa-

Note:—The author is work unit conservationist, Soil Conservation Service, Dandridge, Tenn.

Reverend Roland W. Aytes, Methodist minister, discusses Soil Stewardship observance with a group of ministers and laymen on a conservation tour of the Jefferson Soil Conservation District.

tion kits were made up and were ready for distribution as soon as requests came in. The committee made many personal visits to interested ministers.

Three weeks before the observance, Aytes, Piephoff, and McCray submitted a three-part series of articles to the local newspapers. The series, slanted to general public readership, was published, one article each week.

District Chairman Neal Scarlett, Reverend Aytes, and the Soil Conservation Service technician presented a television program on the significance of Soil Stewardship Week on Station WATE-TV in Knoxville.

County Judge Ray Sherrod made it official by proclaiming May 22–29 Soil Stewardship Week in Jefferson County.

One of the most pleasant tasks of the Soil Stewardship Committee was conducting a field study to show ministers and laymen what good stewardship means on the land. On May 2, the group met in a contour stripcropped field on the farm of John C. Taylor. Besides stripcropping, the group saw sod waterways, farm ponds, wildlife areas, multiflora-rose fences, and improved pastures and meadows.

The committee estimates that more than 3,000 persons heard the Soil Stewardship message, in addition to those reached by newspapers and television.

Tall Fescue—A Winter Grass For Florida

By H. E. Van Arsdall and LeeRoy Wiggins

A PRACTICAL year-round grazing system dreamed of by cattlemen in Florida's Perdido River Soil Conservation District shows promise of coming closer to reality.

They can credit this prospect to renewed interest in and successful experience with tall fescue as a winter pasture grass. So can the soil conservationists who have been searching for still more adequate soil cover than that provided by the Bahia and Coastal Bermuda grasses that have met warm-season needs.

Fescue was first introduced in this district in the early 1940's, but it failed to give the miracle performance expected. In the last few years, better fertilization and management methods have been responsible for the renewed interest in fescue—not as a miracle grass, but as one that is filling in the gap between other grasses in the grazing system.

District farmers are using this grass in several ways. Some depend on it for all or most of their winter grazing, others to supplement small-grain pasture. Some dairymen use it in the winter as roughage replacement for hay or silage. In addition, fescue is proving to be a valuable grass for use in waterways, where it furnishes additional grazing for cattle gleaning cultivated fields during the winter.

Crawford Rainwater is one of those farmers who depend on fescue for most of their winter grazing. This past fall and winter he grazed 70 head of brood cows on 40 acres from October 20 to January 20; and in the winter of 1959-60 he grazed cows and yearlings at a rate of almost three head to the acre for five months. Liberal fertilization with nitrogen plus phosphate and potash has enabled him to obtain this relatively heavy grazing.

"I don't know of any way to winter cows any cheaper than with fescue," said E. J. Gibbs, Rainwater's farm manager.

An additional 90 acres of fescue was planted on this farm last fall and will be ready to graze in the fall of 1961.

Angus brood herd grazing tall fescue pasture on Crawford Rainwater ranch.

Note:—The authors are, respectively, agronomist, Lake City, Fla., and work unit conservationist, Molino, Fla., both of the Soil Conservation Service.

Fescue pasture grazed until April 20 had 5½ tons of green material an acre when photographed on May 10.

A. B. Mason, who planted his first fescue 4 years ago on a 40-acre field, had this to say: "I like the grass because it is ready for grazing in early fall when I can buy steers cheaper than later in the season." He planted 25 acres last fall, to be grazed in the fall of 1961, when he plans to plant another 20 acres. In addition, he uses fescue to protect water-disposal areas and steep slopes surrounding cultivated fields.

George Classon uses his fescue for soil protection and grazing. He planted it on land that is unsuitable for row crops or small grain. Erosion had washed away most of the topsoil. Fescue fits into his system by providing pasture feed in the fall and early winter before small-grain grazing is available, and again after his cattle are taken off the small grain in the spring.

Ward Eicher grazes his 35 head of milk cattle on 10 acres of fescue to supplement small-grain pasture. Last fall cattle were taken off millet in early October and placed on fescue. Although fescue generally is not considered a good milk producer, Eicher said he could see no drop in milk production when the cows were taken off the millet. He said he did notice an increase in milk flow when cattle were turned on wheat this winter, but thought it was the quantity of grazing rather than quality that made the difference.

Martin Crary & Sons have 15 acres of fescue they use as supplemental feed for their dairy herd. This past fall the 80 head of milking cows were grazed for 30 days on this area. Crary said, "We think of fescue as standing hay, reducing our hay ration by one-half when cattle graze fescue." When the cattle were taken off fescue, there was a slight drop in milk flow even though the hay ration was doubled.

Although fescue has been thought to be out of its range in the Gulf Coast area, such experiences during the last few years point to its having a definite place in the grazing system. It fits in well with small-grain production or, with sufficient acreage, will provide all the grazing during fall, winter, and early spring.

Dr. C. E. Hutton, Director of the West Florida Experiment Station at Jay, and Dr. L. S. Dunavin, agronomist at the station, are studying the use of fescue. Their results already have given much valuable information on grazing management and fertilization. Research now in progress can be expected to give farmers further guides in the use of fescue with grains and other concentrated feeds in winter management of cattle.

Little's Bermuda Pays Big

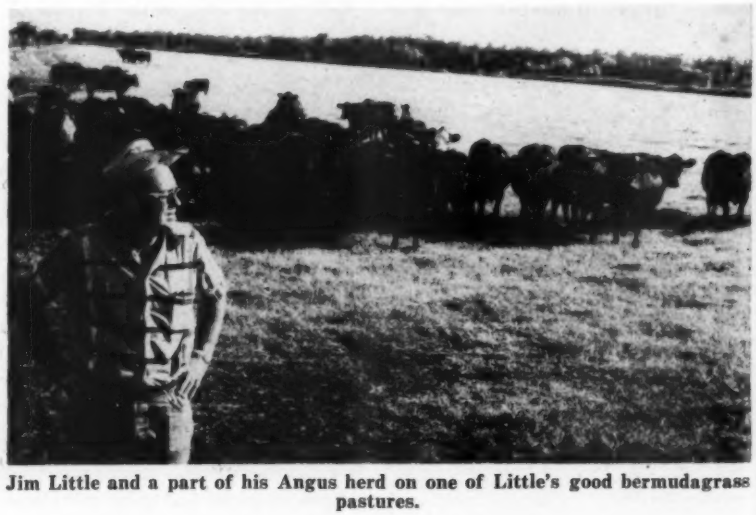
By Bernice DeShong

IT was a tough decision for Jim Little three years ago when he converted his excellent Washita bottomlands from high-yielding row crops to bermudagrass.

But farm machinery was expensive, farm labor was hard to get, and moisture conditions were often a problem; so Jim decided to revamp his bottomlands.

Little has one of the best bottomland farms in Garvin County,

Note:—The author is clerk-typist, Soil Conservation Service, Stillwater, Okla.



Jim Little and a part of his Angus herd on one of Little's good bermudagrass pastures.

Okla. For 10 years, the principal crops on his 540-acre farm had been alfalfa, small grain, corn, and grain sorghum. When moisture conditions were good, the fertile bottomlands of the Washita produced excellent corn. But they were not always favorable, and four years ago Little decided it was time to try out a new crop. He chose bermudagrass.

He was reluctant, however, to put very much of his good bottomland into bermudagrass. He was afraid it might be hard to get rid of if he should decide to go back to row crops. The first year he put only 15 acres into Midland bermudagrass. The second year, he planted an additional 27 acres, and last year another 44 acres, bringing the total to 86 acres.

Jim says he grazed 89 to 110 mature cows and 66 calves on this pasture; and, realizing that he had more grass than cattle, he fenced off 30 acres for hay. This 30 acres produced 1,690 bales of excellent hay in 1960.

Little plans to plant an additional 14 acres to bermudagrass this year to round out a 100-acre field.

Prior to planting of the bermudagrass, this land had been in hairy vetch for two years and was used as supplemental pasture. Little attributes the vigorous start of his bermudagrass to the available nitrogen provided by the legume. After the bermuda became established, he applied fertilizer and phosphate at around 200 pounds per acre and overseeded the grass with vetch, buttonclover, and Korean lespedeza.

Little has been a cooperator with the Garvin Soil Conservation District since 1948. He was given a Bankers Award in 1959 for his outstanding accomplishments in soil conservation.

Jim Little is a grassland farmer now, and likes it. He figures it this way: For the cost of one tractor, he can buy 20 additional cows. In grassland farming, he doesn't need the tractor, and the calf crop harvested from these 20 cows is worth more than the row crops harvested with the tractor.

"And I have discovered," Jim pointed out, "that bermudagrass—far from being an enemy of the soil—is one of the best soil builders I have used. It prevents erosion and adds the needed organic matter. And I also discovered that alfalfa can be planted after bermudagrass, and that small grain, such as wheat and oats, can be planted into the bermudagrass."

No sirree—Jim Little isn't worrying any more about being able to get rid of his bermudagrass.

Wheatgrasses Do a Job

For Arizona Rancher

By Mervin H. Wallace

OWNER. Kel Fox of the Two Bar Cattle Company in Coconino County in north central Arizona has found wheatgrass the answer to supplementing the forage and relieving the grazing pressure on his native rangeland.

Fox started planting wheatgrass in 1950, with 10 pounds of seed supplied by the Soil Conservation Service. The next year he became a cooperator with the Oak Creek Soil Conservation District; and the SCS was able to provide him with 10 more pounds of seed, consisting of regular intermediate wheatgrass, mountain brome, Russian wildrye, crested wheatgrass, slender wheatgrass, and pubescent wheatgrass.

Fox seeded the grasses by hand at his Woods Spring headquarters in a holding and roundup pasture used by the former owner. All except remnants of the native grasses had been killed by overgrazing and trampling. Weeds had taken over, but they were not controlling the sheet and gully erosion that threatened to destroy what once was a beautiful meadow.

Fox succeeded in establishing enough of the wheatgrasses to harvest seed for expansion of the Woods Spring plantings. And within a few years he also was able to seed the entire meadow acreage at his Clay Park ranch, where he harvested 1,500 pounds of seed

Fox and son Jeff standing in field of tall wheatgrass on Clay Park ranch.

Note:—The author is agronomist, Soil Conservation Service, Phoenix, Ariz.

from 25 acres. He sold about half of the seed for 50 to 75 cents a pound and planted the rest in other fields. The Clay Park meadows had been used to raise oats as supplemental feed; but the soil had lost much of its organic matter, and the oat-hay yields had dropped to an unprofitable half a ton to the acre.

The most successful of the numerous ways tried in his grass seeding was with a grain drill with fertilizer attachment. He planted in a seedbed prepared with an offset disk. This placement of fertilizer gave the grass seedlings the extra advantage needed, with limited moisture, for outgrowing the weeds; and bindweeds had almost disappeared after two years' competition.

Yearling Herefords grazing tall wheatgrass before going onto national forest range in background.

As soon as Fox had completed seeding his 95 acres of intermediate wheatgrass and 30 acres of tall wheatgrass, he began to work out techniques to fit the plantings into his overall ranch management program. Fox is naturally a curious man and wants to know the "why" before he goes all out for new methods. He has spent several years trying different fertilizers, applied at various rates and at different times. He has concluded that nitrogen and phosphorus fertilizer appears to be best for his soil, and that there is not too much difference between applying it in late fall or early summer. The soil is too wet to apply fertilizer in the spring.

He belives he has a good carryover of unused fertilizer when the plants are unable to utilize all of it during spring and fall growing periods of limited moisture, which comes as winter snows and summer rains. Fertilizing results in quicker green-up in the spring and later maturity in the fall, increases the density of the grass, and makes it more palatable to grazing animals, including deer and elk which abound in the adjacent forest.

The management plan for Fox's ranch operation, which includes grazing on the Coconino National Forest, provides for no pasture's being grazed longer than four months in a year. The herd is split up part of the year and placed in different pastures. About June 5, the herd is reunited, when the yearlings are detached and put on the wheatgrass pastures until around October 1. They are first put on the tall wheatgrass until it has been properly used, and then are moved to the intermediate wheatgrass. He tries to leave at least 8 to 10 inches of stubble on the tall wheatgrass and 5 to 6 inches on the intermediate. After that date, he moves everything into holding pastures around the Woods Spring headquarters for shipment or movement to winter range. Supplements are fed only to bulls and weaner calves.

Clipping data indicate that the wheatgrasses are outyielding the native grasses. For example, the regular intermediate, without fertilizer, in 1957 yielded 2 tons of air-dry forage an acre, while adjacent native blue grama yielded only ¾ ton. Fox's records show that the yearlings have gained 295 pounds per animal in less than four months on the wheatgrass pastures, or about 2.5 pounds a day.

Kel Fox not only practices conservation, he also preaches it. During the three terms he served in the Arizona House of Representatives and one term in the State Senate he was the chief sponsor of the "Range Land Amendment" to

Amur strain (left) and regular strain of intermediate wheatgrass on Kel Fox ranch at Woods Spring headquarters.

the State soil conservation districts law, adopted in 1953, providing that grazing land as well as "farm" land may be included in the districts. He is now serving his third year as a supervisor of the Verde-Oak Creek district, which chose him outstanding conservationist of the month for February 1955. He also is active in the Tall Pines and Camp Verde Farm Bureaus and is Secretary to the Arizona Water Resources Committee, which sponsors a million-dollar-a-year watershed management research program.

Kel, a Princeton graduate, came to Arizona in 1921 with his father, Frederick Fox. In 1935 he became manager of the Two Bar Cattle Company, which was formed after his father and Frank Gyberg dis-

Fox harvesting intermediate wheatgrass for use on other parts of his ranch.

solved their partnership in the Foxboro ranch. He is proud of the job he has done using the wheatgrasses and better management to improve his range and control erosion. The gullies are healing over, and sheet erosion is almost a thing of the past on the ranch that the Foxes' sons, Jeff and Grady, are expected to take over some day.

POLITICS AND GRASS: THE ADMINISTRATION OF GRAZING ON THE PUBLIC DOMAIN. By Phillip O. Foss. 236 pp. 1960. University of Washington Press: Seattle. $4.50.

"Politics and Grass" starts with a brief history of the public domain and the various acts of Congress designed to dispose of these lands. The author's explanation of why most of these attempts failed provides a suitable background for the detailed study of the policies and administration of the Taylor Grazing Act of 1934, which is the main subject of his book. The picture he paints is not a pretty one and reflects little credit on some of the actions of the early administrators of this legislation or on those of many leaders of the livestock industry. These actions, the author feels, have circumvented the basic purposes of the legislation in many areas.

The author thinks the basic error in judgment was made when Secretary Harold L. Ickes told the Congress that this area of 160 million acres—larger than France—could be administered for $150,000 a year and that the grazing fees charged the stockmen should not be allowed to exceed these costs. The Act itself provided that "reasonable fees" would be established, but for the next twenty years the stockmen and their Congressional supporters were able to use the Secretary's testimony as a weapon to hold the fees to a minimum and, in turn, prevent the employment of a force adequate to administer the lands properly.

The first Director of Grazing, with a force of only twenty men, turned for help to the stockmen whose use of the public range he was supposed to regulate. Stockmen's boards were set up. While these were called "Advisory Boards," in practice they were not only allowed but encouraged "to become the local governing agency as to all matters of a range regulatory nature concerning their particular districts." They largely decided who would use the range and how many animals would be allowed to run on the public lands.

As a student of government, Mr. Foss has used the case history method to develop his theme that a relatively small group with powerful political support has been able to influence public policy, develop the rules, and eventually assume the powers required to execute that policy in a manner favorable to its own interests. He concludes that under the domination of the Advisory Board system there has been little improvement of the public range and that injury has not been stopped, although it has been lessened.

The study was based on a careful examination of much of the available source materials. These included minutes of the Advisory Boards, records of Congressional hearings, working files of the Bureau of Land Management, and firsthand information from many of the principals involved, both public officials and stockmen. Although the facts presented may not be disputed, their selection and interpretation is another matter.

To this reviewer, the book is decidedly one-sided. The author gives great emphasis to incidents in which the stockmen exercised an improper influence but little credit to their many constructive actions, or to the highly important assistance they rendered in efforts to help carry out the provisions of the Taylor Grazing Act.

—F. G. RENNER

PRIVATE GRAZING AND PUBLIC LANDS. By Wesley Calef. 292 pp. Illus. 1960. University of Chicago Press: Chicago. $9.50.

Passing of the Taylor Grazing Act by Congress in 1934 put an end to hard-fought political contests over disposal of the public domain in the western United States. It ended 75 years of free common use of the remaining "vacant, unappropriated, and reserved" Federal lands and substituted a system of leasing them for grazing.

Western livestock association leaders had campaigned vociferously for years for sale of these lands on a preferential basis to ranchers using them at time of sale. The opposition lambasted the plan as a wholesale land grab. Meanwhile, many rangelands were being damaged severely by users competing for free grass.

The author says the principal aim of his monograph is to provide reliable observations and information, primarily for easterners, who have an inherent responsibility in this matter, on how we should act with respect to the Taylor grazing lands.

Dr. Calef reaches his goal quite admirably in part. He sets up his case with courage and reviews public land administration fairly and frankly. Praise is given to Bureau of Land Management personnel for devoted service under continual fire. Reasons for the Bureau's failure to improve the natural resources of these lands are evaluated, and recommendations made for improvements. One of the big problems is the difference of opinion between livestock organizations and the BLM regarding needs for improving public lands, including

cuts in numbers of animals allowed to graze, and upgrading of grazing fees proposed by the Bureau.

There are sound descriptions of grazing districts in western Wyoming, but summaries of the other grazing districts are missing. The reader also should have been given more public domain history, plus a better review of the colorful warfare of words between the contending factions.

—B. W. ALLRED

Tests Show Best Nitrogen Fertilizer Rates

Annual applications of 80 to 160 pounds of nitrogen an acre on six forage grasses grown under irrigation proved to be the most efficient fertilization rate in a three-year study at Colorado State University.

The study was conducted with smooth bromegrass, orchardgrass, tall fescue, tall oatgrass, and intermediate and tall wheatgrass.

At the 80- and 160-pound rates, intermediate and tall wheatgrass produced the highest yields, followed by tall fescue and tall oatgrass. Smooth bromegrass and orchardgrass produced the lowest yields at these rates. The yields averaged 2.30 tons an acre for the 6 grasses on a check plot with no nitrogen applied, 3.20 tons an acre at the 80-pound level, 3.75 tons at the 160-pound level, 4.25 tons at the 320-pound level, and 4.45 tons at the 640-pound level.

Nitrogen applications increased the amount of total nitrogen in all of the grasses. Increased nitrogen content indicates a higher crude protein content. High rates of nitrogen fertilizer—320 and 640 pounds to the acre—resulted in a loss of stand and reduced the percentage of nitrogen fertilizer recovered by the forage from the soil.

Generally, yields continued to increase at rates above 160 pounds, as did the nitrogen content of the grasses. But the applied nitrogen recovery rate from the soil (the relation of the amount of nitrogen used by the plant to the amount applied) usually reached a peak at the 80- or 160-pound rate and declined sharply with the higher applications.

A New Editor

This is the last issue of SOIL CONSERVATION for your editor of the past five years, who will be on another assignment before retiring from the Soil Conservation Service in a few months. Beginning with the June issue, your new editor will be Frank B. Harper, himself a 25-year veteran in the Service's information program in the field and in Washington. A graduate of Arkansas Polytechnic Institute and the University of Missouri School of Journalism and an Associated Press man for a decade, he brings to SOIL CONSERVATION a working lifetime of reportorial and editorial experience.

Editing SOIL CONSERVATION has been perhaps the most satisfying experience of my own 26 years with the SCS. Nothing ever can be more important to all of us—this space age notwithstanding—than the conservation and efficient use of our soil, water, and related resources. I feel sure this magazine will continue to make its important month-by-month contribution to attainment of this goal for which it has strived since the first issue in August 1935. My thanks to all who have contributed to its columns and who have read SOIL CONSERVATION during my tenure as editor.

—TOM DALE

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Grazing studies by the Louisiana Agricultural Experiment Station indicated that Coastal bermudagrass is far superior to common bermuda or Dallis grass. The experiments showed that 600 to 800 pounds of salable beef can be produced per acre by grazing, with the surplus forage being cut for hay to be fed back to the cows during the winter.

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Tests at the University of Nevada Agricultural Experiment Station showed that irrigated pastures can produce up to 1,100 pounds of beef to the acre. The average number of pounds produced by the four grasses used, in 1959 and 1960, were: Orchardgrass, 1,122 pounds; smooth bromegrass, 954 pounds; tall fescue, 952 pounds; and intermediate wheatgrass, 900 pounds.

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Approximately 28.6 million acres of cropland in the U. S. will be held out of production in 1961 under the Conservation Reserve.